

(12) United States Patent Stong et al.

(10) Patent No.:

US 6,562,480 B1

(45) Date of Patent:

May 13, 2003

(54)	WEAR	RESISTANT	COATING	FOR	PISTON
	RINGS				

(75) Inventors: Thomas C. Stong, Kent City, MI (US); Peter J. Einberger, Muskegon, MI

(US); Thomas J. Smith, Muskegon, MI

- (73) Assignee: Dana Corporation, Toledo, OH (US)
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 20 days.
- (21) Appl. No.: 09/757,891
- (22) Filed: Jan. 10, 2001
- (51) Int. Cl.⁷ C22C 19/05; B32B 15/00; B32B 15/16; B23P 15/08
- U.S. Cl. 428/546, 428/569; 428/660; 428/663; 428/666; 29/888.074
- 428/660, 663, 666; 29/888.074

(56)References Cited

U.S. PATENT DOCUMENTS

3,556,747	Α	1/1971	Hyde et al 29/198
4,039,399	Α	8/1977	Wallace et al 204/25
4,123,072	Α	10/1978	Sharpe 277/216
4,208,845	Α	6/1980	Sharpe 51/290
4,334,927	Α	6/1982	Hyde et al 75/240
4,592,964	Α	6/1986	Buran et al 428/610
4,612,256	A	9/1986	Neuhauser et al 428/547
4,756,841	Α	7/1988	Buran et al 252/26

5,126,104	Α	6/1992	Anand et al 419/12
5,547,203	Α	8/1996	Binford 277/224
5,592,927	Α	1/1997	Zaluzec et al 123/668
5,605,741	A	2/1997	Hite et al 428/216
5,702,769	Α	12/1997	Peters 427/451
5,713,129	Α	2/1998	Rastegar et al 29/888.04
5,713,324	Α	2/1998	Frame et al 123/193.6
5,756,150	Α	5/1998	Mori et al 427/197
5,763,106	Α	6/1998	Blanchard et al 428/570
5,773,734	Α	6/1998	Young 75/243
5,863,618	Α	1/1999	Jarosinski et al 427/450
5,906,896	Α	5/1999	Jackson et al 428/621

OTHER PUBLICATIONS

Dana Perfect Circle Division Material Specification, No. PCF-284, Issued Jul. 8, 1999.

Dana Perfect Circle Division Material Specification, No. PCHP-2, Issued Jan. 10, 2000.

Primary Examiner-John J. Zimmerman Assistant Examiner-Jason Savage

(74) Attorney, Agent, or Firm-Rader, Fishman & Grauer PLLC

(57)**ABSTRACT**

A wear resistant coating for protecting surfaces undergoing sliding contact is disclosed. The wear resistant coating is applied by high velocity oxygen-fuel (HVOF) deposition of a powdered blend of the coating constituents. The powdered blend includes a nickel-chromium alloy, chromium carbide, and molybdenum. The disclosed coating should find use as a bearing surface on piston rings, cylinder liners, and other components of a power cylinder assembly of an internal combustion engine.

10 Claims, 3 Drawing Sheets

